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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,011	01/08/2004	Paul Reuben Day	ROC920030217US1	7133

30206 7590 11/12/2008

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EXAMINER	
LOVEL, KIMBERLY M	

ART UNIT	PAPER NUMBER
2167	

MAIL DATE	DELIVERY MODE
11/12/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/754,011	DAY ET AL.	
	Examiner	Art Unit	
	KIMBERLY LOVEL	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-10,13 and 15-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,7-10,13 and 15-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This communication is in response to the Amendment filed 11 August 2008.

2. Claims 1, 3-5, 7-10, 13 and 15-19 are currently pending and claims 2, 6, 11, 12, 14 and 20-24 are canceled. In the Amendment filed 11 August 2008, none of the claims are amended. This action is made Non-Final.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1, 3-5, 7-10, 13 and 15-19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

5. Claims 1, 3-5, 7-10, 13 and 15-19 are directed towards a method for optimizing a database query. According to *In re Bilski* "The Supreme Court ... has enunciated a definitive test to determine whether a process claim is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to preempt the principle itself. A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing." According to one of ordinary skill in the art, this method can be performed by a person (i.e., mental steps). The specification fails to tie the system to an embodiment that comprises hardware. Since the claim fails to meet the

requirements mentioned above, the claim fails to fall within one of the four statutory categories (i.e., process, machine, manufacture, or composition of matter).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 3-5, 9, 10, 13, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,757,677 to Pham et al (hereafter Pham) in view of the background of US Patent 6,662,175 to Ghazal et al (hereafter Ghazal) in view of the Bulletin of the Technical Committee on Data Engineering (hereafter Data Engineering).

Referring to claim 1, Pham discloses a method for optimizing a database query, the database query including criteria that references a plurality of tables in order to re-order a result set generated for the database query, wherein the criteria is one of a GROUP BY clause [group by] or an ORDER BY clause (see abstract and column 3, lines 9-36).

While Pham discloses a query with at least one search condition [where clause], Pham fails to explicitly disclose the further limitations of applying transitive closure analysis to at least one search condition in the query to identify an equivalent field for a field referenced in the criteria; and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby by substituting the equivalent field for the field referenced in the criteria to generate modified criteria that references only one table, based on transitive closure analysis. Ghazal discloses query optimization (see column 1, lines 7-9), including the further limitations of applying transitive closure analysis to at least one search condition in the query to identify an equivalent field for a field referenced in the criteria (see column 1, lines 22-36); and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby by substituting the equivalent field for the field referenced in the criteria to generate modified criteria, based on transitive closure analysis (see column 1, lines 37-38). While Ghazal discloses referencing only one row (see column 1, lines 37-38), Ghazal fails to disclose referencing only one table. It would have been obvious to one of ordinary skill in the art to apply the concept of referencing only one row in order to

reference only one table. One would have been motivated to do so since this is the basic purpose of query rewrite.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the transitive closure disclosed by Ghazal to optimize the query of Pham. One would have been motivated to do so since it is well-known that query optimization improves overall performance which reduces resource utilization (Ghazal: see column 1, lines 7-20).

While the combination of Pham and Ghazal (hereafter Pham/Ghazal) applies the concept of transitive closure to a database query to reduce the number of rows referenced, Pham/Ghazal fails to explicitly disclose wherein the transitive closure reduces the number of tables referenced. Data Engineering discloses the concept of utilizing transitive closure on both single-table and join predicates, including the further limitation of applying the transitive closure to reduce the number of tables referenced [T1.C1=T2.C2 AND T2.C2=T3.C3 will cause the DB2 to generate T1.C1=T3.C3] (see page 7, lines 17-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the transitive closure of Pham/Ghazal which reduces the rows referenced to reduce a number of tables references as in the manner as disclosed by Data Engineering. One would have been motivated to do so in order to improve performance dramatically through the transformation of subqueries to joins.

Referring to claim 3, the combination of Pham/Ghazal and Data Engineering (hereafter Pham/Ghazal/Data) discloses the method according to claim 1, further

comprising the step of: determining if the criteria references a first field from a first table and a second field from a second table (Pham et al: see column 3, lines 30-50 – x1 is considered to represent the first field from the first table; y3 is considered to represent the second field from a second table).

Referring to claim 4, Pham/Ghazal/Data discloses the method according to claim 3, wherein the rewriting step comprises the step of: rewriting the criteria to reference the first field and a third field from the first table, wherein a first search condition in the query searches on a match between the first field and the second field, and a second search condition in the query searches on a match between the second field and the third field, and where applying transitive closure analysis includes determining that the third field is equivalent to the second field in the criteria (Pham et al: see column 5, lines 47-65; Tao: see column 7, lines 10-19; column 8, lines 9-18; and column 8, lines 43-60).

Referring to claim 5, Pham/Ghazal/Data discloses the method according to claim 1, further comprising the step of: determining if the criteria references a plurality of tables (Pham et al: see column 4, line 58 – column 5, line 13).

Referring to claim 9, Pham/Ghazal/Data discloses the method according to claim 1, wherein the database query involves a plurality of join operations and the method further comprises the step of: running the query according to a join order that is based on the modified criteria (Pham et al: see column 6, lines 46-54).

Referring to claim 10, Pham discloses a method of optimizing a database query, the database query including criteria that references a plurality of tables in order

to re-order a result set generated for the database query, wherein the criteria is one of a GROUP BY clause [group by] or an ORDER BY clause (see abstract and column 3, lines 9-36).

While Pham discloses a query with at least one search condition [where clause], Pham fails to explicitly disclose the further limitations of applying transitive closure analysis to at least one search condition in the query to identify an equivalent field for a field referenced in the criteria; and rewriting the criteria, based on the transitive closure analysis, to generate a modified criteria by substituting the equivalent field for the field referenced in the criteria , wherein the criteria references a plurality of tables and the modified criteria references a single table; said modified criteria operating to re-order a result set of the database query and avoid creating a temporary file during operation. Ghazal discloses query optimization (see column 1, lines 7-9), including the further limitations of applying transitive closure analysis to at least one search condition in the query to identify an equivalent field for a field referenced in the criteria (see column 1, lines 22-36); and rewriting the criteria, based on the transitive closure analysis, to generate a modified criteria by substituting the equivalent field for the field referenced in the criteria , wherein the criteria references a plurality of tables and the modified criteria references a single table; said modified criteria operating to re-order a result set of the database query and avoid creating a temporary file during operation (see column 1, lines 37-38). While Ghazal discloses referencing only one row (see column 1, lines 37-38), Ghazal fails to disclose referencing only one table. It would have been obvious to one of ordinary skill in the art to apply the concept of referencing only one row in order

to reference only one table. One would have been motivated to do so since this is the basic purpose of query rewrite.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the transitive closure disclosed by Ghazal to optimize the query of Pham. One would have been motivated to do so since it is well-known that query optimization improves overall performance which reduces resource utilization (Ghazal: see column 1, lines 7-20).

While the combination of Pham and Ghazal (hereafter Pham/Ghazal) applies the concept of transitive closure to a database query to reduce the number of rows referenced, Pham/Ghazal fails to explicitly disclose wherein the transitive closure reduces the number of tables referenced. Data Engineering discloses the concept of utilizing transitive closure on both single-table and join predicates, including the further limitation of applying the transitive closure to reduce the number of tables referenced [T1.C1=T2.C2 AND T2.C2=T3.C3 will cause the DB2 to generate T1.C1=T3.C3] (see page 7, lines 17-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the transitive closure of Pham/Ghazal which reduces the rows referenced to reduce a number of tables references as in the manner as disclosed by Data Engineering. One would have been motivated to do so in order to improve performance dramatically through the transformation of subqueries to joins.

Referring to claim 13, Pham discloses a method for optimizing a database query, the database query involving a plurality of join operations and a plurality of

search conditions, including criteria that references a plurality of tables in order to re-order a result set, wherein the criteria is one of a GROUP BY clause [group by] or an ORDER BY clause (see abstract and column 3, lines 9-36).

While Pham discloses a query with at least one search condition [where clause], Pham fails to explicitly disclose the further limitations of applying transitive closure analysis to a plurality of search conditions in the query to determine a subset of equivalent search fields; and rewriting a criteria to generate a set of respective modified criteria that each reference one or more equivalent search fields; and selecting join order from among a plurality of join orders for the plurality of join operations using at least one of the set of respective modified criteria. Ghazal discloses query optimization (see column 1, lines 7-9), including the further limitations of applying transitive closure analysis to a plurality of search conditions in the query to determine a subset of equivalent search fields (see column 1, lines 22-36); and rewriting a criteria to generate a set of respective modified criteria that each reference one or more equivalent search fields; and selecting join order from among a plurality of join orders for the plurality of join operations using at least one of the set of respective modified criteria (see column 1, lines 37-38).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the transitive closure disclosed by Ghazal to optimize the query of Pham. One would have been motivated to do so since it is well-known that query optimization improves overall performance which reduces resource utilization (Ghazal: see column 1, lines 7-20).

While the combination of Pham and Ghazal (hereafter Pham/Ghazal) applies the concept of transitive closure to a database query to reduce the number of rows referenced, Pham/Ghazal fails to explicitly disclose wherein the transitive closure reduces the number of tables referenced. Data Engineering discloses the concept of utilizing transitive closure on both single-table and join predicates, including the further limitation of applying the transitive closure to reduce the number of tables referenced [T1.C1=T2.C2 AND T2.C2=T3.C3 will cause the DB2 to generate T1.C1=T3.C3] (see page 7, lines 17-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the transitive closure of Pham/Ghazal which reduces the rows referenced to reduce a number of tables references as in the manner as disclosed by Data Engineering. One would have been motivated to do so in order to improve performance dramatically through the transformation of subqueries to joins.

Referring to claim 15, Pham/Ghazal/Data discloses the method according to claim 13; further comprising the step of: running the query according to a join order, the join order determined by selecting one of the set of respective modified criteria (Pham et al: see column 14, lines 42-61).

Referring to claim 18, Pham/Ghazal/Data discloses the method according to claim 17, further comprising the step of: running the query according to a join order, the join order determined by selecting one of the subset of respective modified criteria (Pham et al: see column 13, line 41 – column 14, line 18).

Referring to claim 19, Pham/Ghazal/Data discloses method according to claim 13, further comprising the steps of:

performing cost analysis on each of the set of respective modified criteria (Goel et al: see column 15, lines 20-25); and

running the query according to a join order, the join order determined based on the cost analysis (Goel et al: see column 15, lines 20-25).

9. Claims 7-8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,757677 to Pham et al in view of US Patent No 6,662,175 to Ghazal et al in view of the Bulletin of the Technical Committee on Data Engineering as applied respectively to claims 1 and 13 above, and further in view of US Patent No 5,598,559 to Chaudhuri.

Referring to claim 7, Pham/Ghazal/Data discloses a method for optimizing a database query. However, Pham/Ghazal/Data fails to explicitly disclose the further limitation of building an index over a column of the one table. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of building an index over a column of the one table (see column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One

would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys.

Referring to claim 8, Pham/Ghazal/Data discloses a method for optimizing a database query. However, Pham/Ghazal/Data fails to explicitly disclose the further limitation of building an index over more than one column of a table among a plurality of tables. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of building an index over more than one column of a table among a plurality of tables (see column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys.

Referring to claim 16, Pham/Ghazal/Data discloses a method for optimizing a database query. However, Pham/Ghazal/Data fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys.

Referring to claim 17, Pham/Ghazal/Data discloses a method for optimizing a database query. However, Pham/Ghazal/Data fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys.

Response to Arguments

10. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY LOVEL whose telephone number is (571)272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John R. Cottingham/
Supervisory Patent Examiner, Art Unit 2167

Kimberly Lovel
Examiner
Art Unit 2167

3 November 2008
kml